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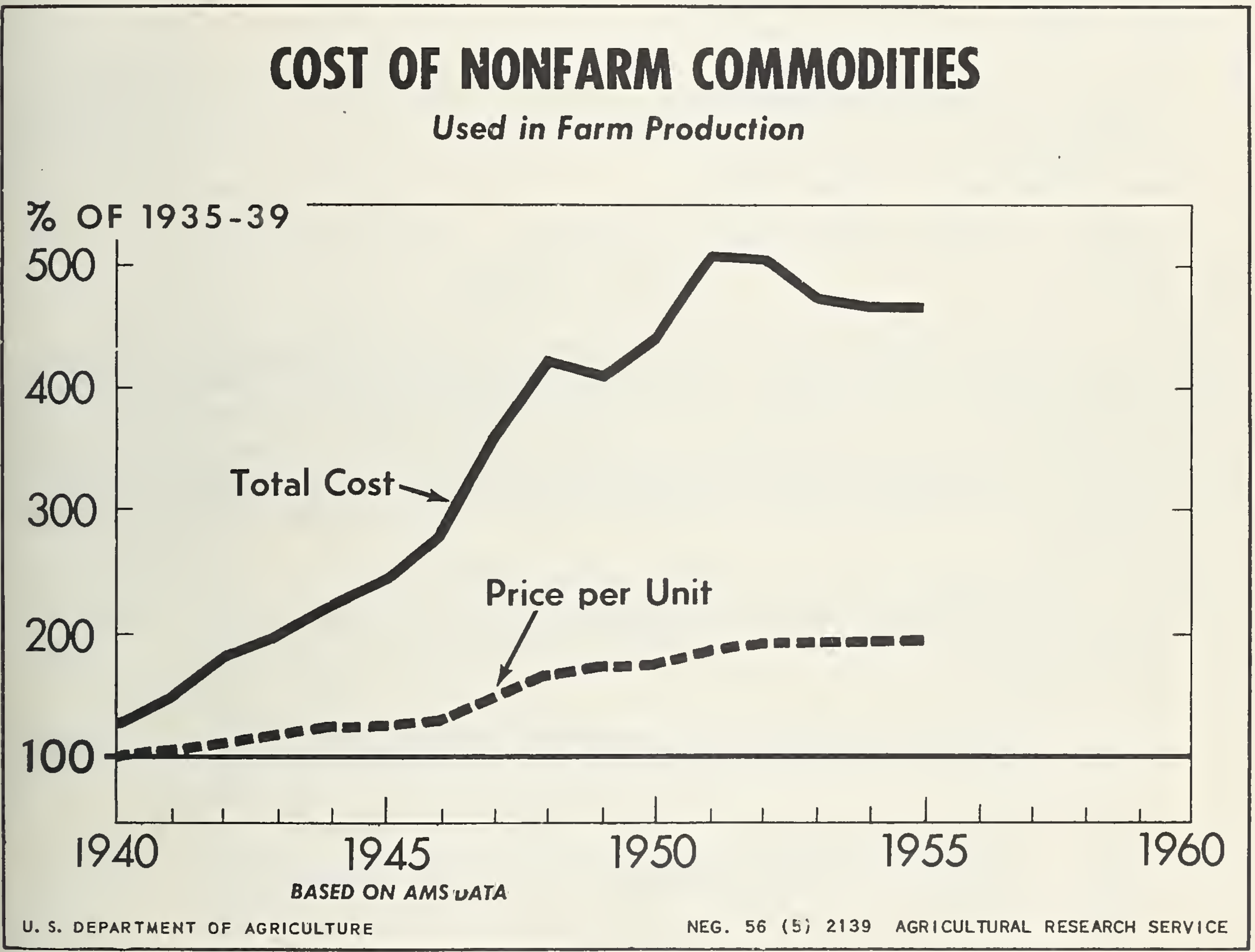
May 16, P. M.

THE FARM COST SITUATION

Agricultural Research Service
UNITED STATES DEPARTMENT OF AGRICULTURE

ARS 43-29 (FCS-20) MAY 1956



COST OF NONFARM COMMODITIES
Used in Farm Production

BASED ON AMS DATA

U. S. DEPARTMENT OF AGRICULTURE NEG. 56 (5) 2139 AGRICULTURAL RESEARCH SERVICE

The total cost of nonfarm commodities used in farm production is now nearly 5 times as high as in 1935-39. Prices paid for these items are about twice as high as they were then. Nonfarm commodities include farm machinery, motor vehicles, motor supplies, fertilizer and lime, building and fencing materials, and other farm supplies.

Goods and services used in production: Cost rates and prices paid by farmers, United States

Index numbers (1947-49=100)

Year or period	Commodities, interest, taxes, and wage rates	Commodities only	Feed	Livestock	Motor supplies	Motor vehicles	Farm machinery	Farm supplies	Building and fencing materials	Ferti- lizer	Seed	Wage rates
1910-14	39	42	43	29	---	---	42	42	34	70	41	23
1915-19	59	63	68	44	---	---	54	70	48	101	62	34
1920-24	65	61	60	33	---	---	65	77	57	101	60	42
1925-29	65	61	58	44	94	49	64	73	54	92	60	43
1930-34	50	47	39	25	74	49	61	61	47	75	40	28
1935-39	49	52	45	36	74	56	64	60	49	71	49	28
1940	49	52	43	41	71	56	64	62	49	69	42	30
1941	53	55	47	46	74	59	65	66	53	69	40	35
1942	60	62	57	54	79	64	69	73	58	76	54	46
1943	68	69	68	61	81	67	71	82	60	81	68	61
1944	73	73	75	58	82	73	73	86	64	83	77	74
1945	77	74	74	63	82	75	74	87	66	84	79	83
1946	83	81	87	72	84	77	76	88	72	85	81	90
1947	95	95	102	90	92	90	86	95	93	93	93	97
1948	104	105	109	111	103	100	101	100	104	102	109	103
1949	101	100	89	99	105	110	113	105	103	105	98	100
1950	104	104	91	116	106	110	115	105	105	101	94	99
1951	115	115	102	141	111	118	124	112	117	106	96	109
1952	117	116	109	118	112	123	129	119	118	109	109	117
1953	112	106	98	83	114	122	130	120	118	110	100	119
1954	112	106	98	85	116	123	131	117	119	108	93	119
1955	112	105	92	84	116	126	132	114	122	107	102	120
Jan.	114	107	97	88	---	124	---	---	---	---	---	121
Feb.	114	108	97	89	---	---	---	---	---	---	105	---
Mar.	115	108	96	92	116	125	131	115	120	---	104	---
Apr.	114	107	95	91	---	---	---	115	---	107	104	120
May	113	106	94	84	---	---	---	---	---	---	104	---
June	113	105	93	85	116	125	132	113	121	---	---	---
July	112	105	91	81	---	124	---	---	---	---	---	119
Aug.	111	104	89	80	---	---	---	---	---	---	---	---
Sept.	111	104	87	81	116	126	134	113	123	106	94	---
Oct.	111	104	87	82	---	---	---	---	---	---	---	120
Nov.	111	103	86	77	---	129	---	---	---	---	---	---
Dec.	111	103	87	72	116	130	135	114	124	---	---	---
1956												
Jan.	112	104	87	78	---	129	---	---	---	---	---	121
Feb.	112	103	87	78	---	---	---	---	---	---	85	---
Mar.	112	104	87	79	117	130	136	117	125	---	85	---
Apr.	114	105	88	81	---	---	---	117	---	105	86	125

Agricultural Marketing Service.

THE FARM COST SITUATION

Approved by the Outlook and Situation Board, May 8, 1956

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GENERAL SITUATION

Prices and cost rates paid by farmers for goods and services used in production average about the same this spring as they did a year ago. Prices paid for industrial commodities in general, farm wage rates, and taxes are higher while prices paid for feed, seed and livestock are lower. However, prices paid for production items that originate on farms have increased somewhat in recent months.

How cost rates this spring compare with those of a year ago follow:

Farm real estate taxes per acre	Up 6	percent
Motor vehicle prices (March 15)	Up 5	"
Wage rates (April 1)	Up 4	"
Building and fencing materials (March 15)	Up 4	"
Farm machinery prices (March 15)	Up 4	"
Farm real estate prices (March 1)	Up 3	"
Farm supplies (March 15)	Up 1	"
Motor supplies (March 15)	Up 1	"
Fertilizer (April 15)	Down 2	"
Feed (April 15)	Down 7	"
Feeder livestock (April 15)	Down 11	"
Seed (April 15)	Down 18	"

Although prices paid for feed, seed, and livestock have declined while prices paid for industrial items have increased in recent years, the relationship between these two groups of prices is similar to the relationship between them before World War II.

Cost-Price Relationship

The relationship between farm production cost rates and prices received by farmers is somewhat less favorable to farmers this spring than it was a year ago. Record crop yields in 1955, heavy marketings of both cattle and hogs, and further accumulation of surplus stocks have all contributed to the downward pressure on farm commodity prices during the past year. However, the situation has improved slightly since December.

Production Expenses

Production expenses of U. S. farm operators were about 1 percent higher in 1955 than in 1954. Farm mortgage interest payments were up 9 percent whereas livestock purchases, farm real-estate taxes, and depreciation charges on capital items were up 6, 5, and 4 percent, respectively. About three-fourths of the total increase in these 4 items was offset by a 6-percent decline in expenditures for feed which resulted chiefly from a substantial drop in prices of feed grains.

Present and Prewar Cost Situations Compared

Since 1940 all major categories of farm operators' production expenses have increased although at different rates (fig. 1). The overall advance has been from about $6.7 billion in 1940 to about $22.4 billion in 1955, an increase of about 232 percent. Depreciation charges on capital items, including machinery and buildings, have increased the most, about 400 percent. Farm mortgage interest payments, on the other hand, have increased the least, only 40 percent.

Changes in cost rates and prices paid by farmers for goods and services used in production during this period (fig. 2) explain only part of the changes in farmers' production expenses. For example, despite a 35-percent increase in farm output and a 300-percent increase in farm wage rates, total wages paid to farm workers increased only 203 percent. And, although prices paid for fertilizer and lime increased 55 and 22 percent, respectively, total expenditures for fertilizer and lime increased nearly 300 percent.

Revolutionary changes in farming methods have greatly changed the use of various resources. The number of hired workers has declined about 29 percent but the total use of plant nutrients has increased about 270 percent. A given level of farm output is now produced on fewer farms, with less land, fewer workers, and fewer work animals but with considerably more machinery and fertilizer (fig. 3). Many other improved practices have been adopted also.

Farmers depend a great deal more on nonfarm goods and services than they did formerly. Since 1940 they have tended to increase their use of the input factors that have gone up the least in price, such as fertilizer, and to reduce their use of the inputs that have gone up the most, such as hired labor. By making these changes, individual farmers have been able to increase their net returns over what they would have been otherwise. In the process, they have increased total output substantially, but they have also increased their total cash outlay.

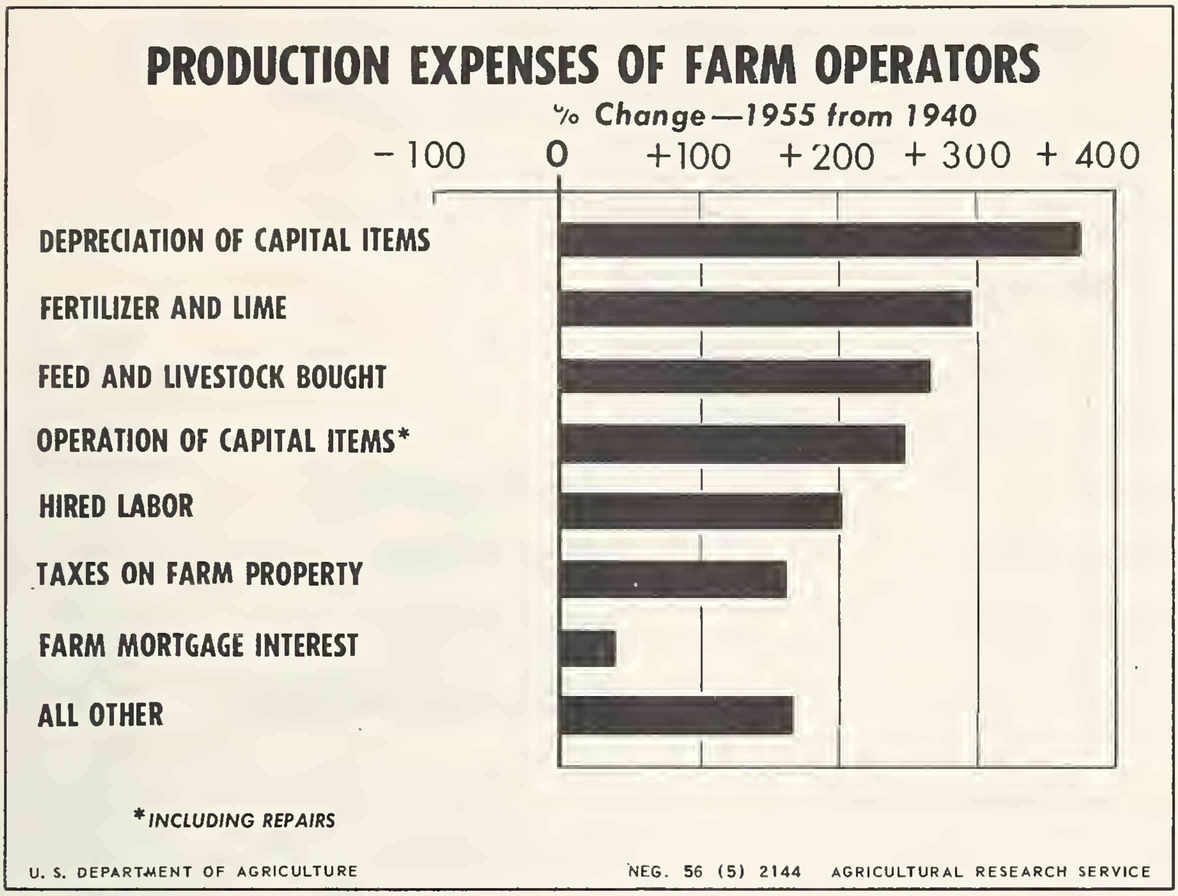


Figure 1

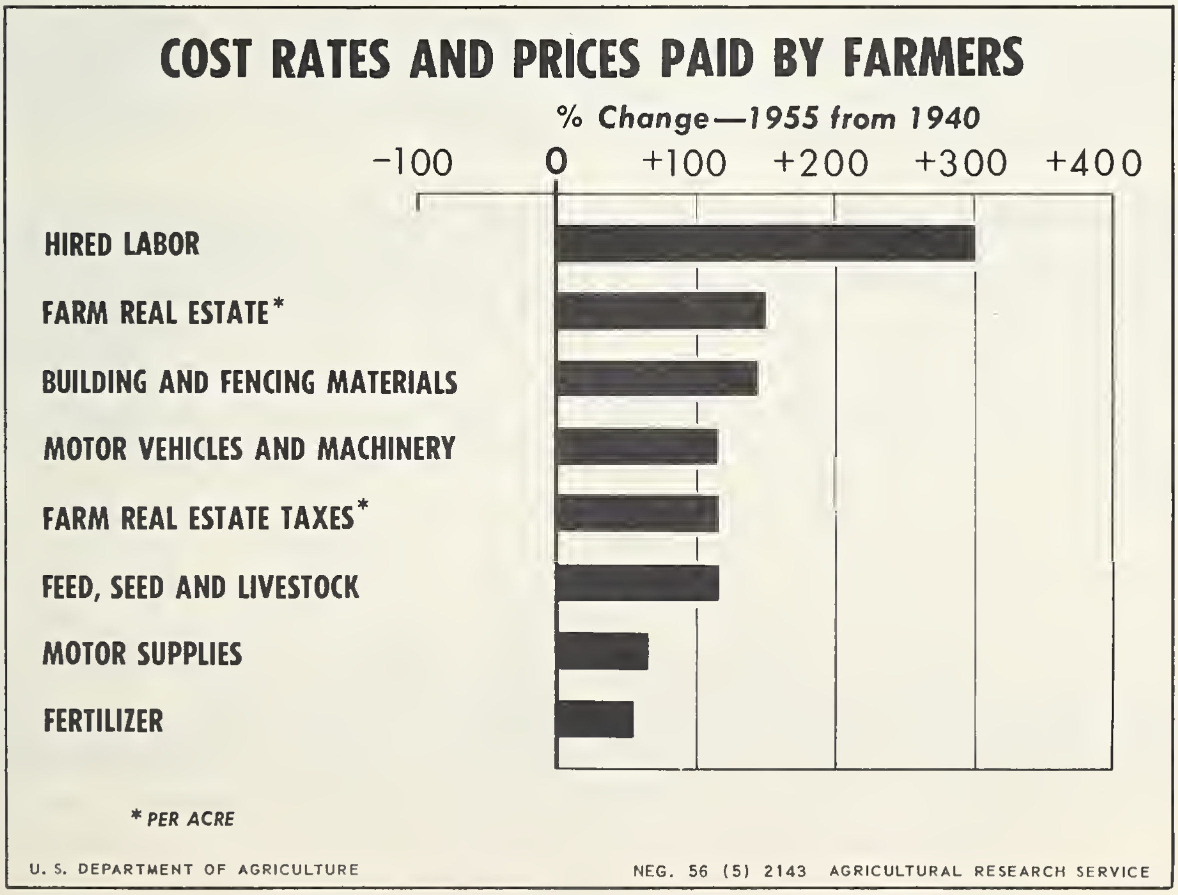


Figure 2

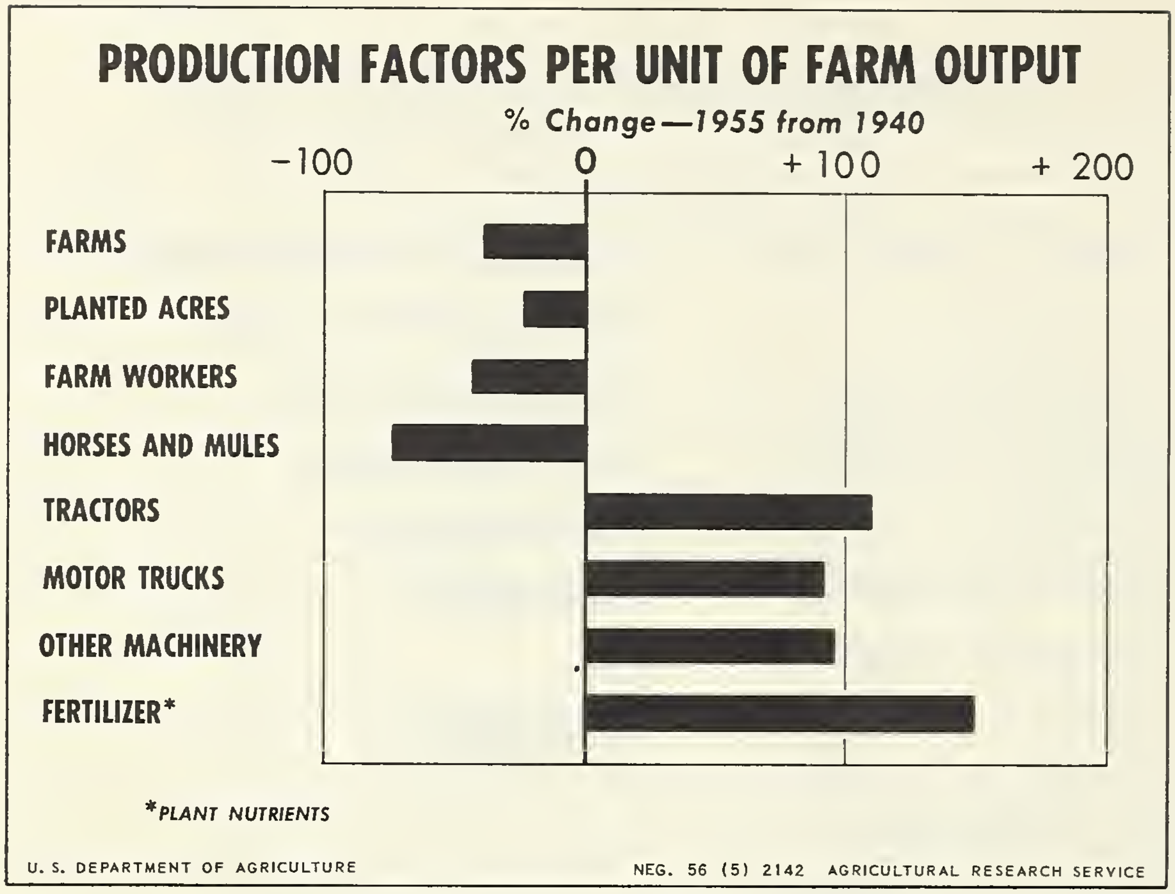


Figure 3

New Technology

Farmers are still adjusting to changes in farm cost rates and to new technology. Some of the more recent developments, including the increased use of nitrogen fertilizer, bulk milk tanks, and medicated feeds, are discussed in greater detail later in this issue.

The combined effect of these and other changes on costs of production on 23 important types of farms since 1947-49 is also presented. Apparently on some types of farms, increased operating efficiency has kept cost per unit of production from increasing as fast as the index of prices paid. On other types of farms, this has not been the case. Less favorable weather in some areas and substantial increases in capital charges generally have tended to offset the effects of more efficient methods on unit costs of production.

FARM LABOR

Farm wage rates are higher this spring than they were a year ago in all parts of the country. On April 1, 1956, the United States average was 4.3 percent higher than a year earlier (table 1). The greatest increases

Table 1.- Average farm wage rates, April 1, 1956, compared with rates on April 1, 1955, by regions

Region	Average wage rates, April 1, 1956 1/ With board and room, per month	Without board or room Per day	Per hour	Increases, 1955 to 1956
	Dollars	Dollars	Dollars	Percent
New England	130	8.40	1.08	4.9
Middle Atlantic	125	7.90	1.01	4.7
East North Central	124	7.80	1.03	4.5
West North Central	125	7.90	.99	1.5
South Atlantic	2/	5.10	.68	3.1
East South Central	2/	4.15	.57	6.4
West South Central	2/	5.40	.67	5.5
Mountain	155	7.90	.96	4.5
Pacific	190	2/	1.11	3.4
United States	123	5.40	.89	4.3

1/ Selected from 9 types of rates for which averages are reported.
2/ Relatively unimportant in this region.

From the monthly report "Farm Labor," prepared by the Agricultural Marketing Service, U. S. Department of Agriculture.

occurred in the East and West South Central Regions where rates were 6.4 and 5.5 percent higher, respectively. Average wage rates for the country as a whole on April 1, 1956, were: $123 per month with board and room, and $5.40 per day and 89 cents per hour without board and room.

Generally higher wage rates in industry and the relative ease of obtaining nonagricultural employment are prime factors in higher farm wage rates this year. The new minimum wage of $1.00 per hour, applicable to most industrial jobs, that become effective March 1, 1956, may also have had some indirect effect.

The supply of experienced year-round farmworkers continues tight. Workers from foreign sources will be available again this year for seasonal farmwork in areas certified as having an insufficient supply of workers from domestic sources. On March 15, 1956, about 71,000 foreign workers, mostly Mexican Nationals, were working on farms in this country, according to reports of the Bureau of Employment Security, United States Department of Labor. This number compares with about 64,000 on the same date in 1955.

In total, more than 410,000 workers from Mexico, British West Indies, and Canada were brought in at various times for seasonal jobs last year. This was an increase of more than a fourth from 1954. Many of the additional

Mexican Nationals contracted in the last few years replaced those that entered illegally in previous years. Rigid control to prevent illegal entry is being maintained. Of those brought in last year, the greatest number were employed late in October when about 240,000 were working on farms. At that time, they constituted approximately 9.5 percent of all hired farm workers.

FARM POWER AND MACHINERY

Dealers' list prices of farm machines and equipment are now more than double the prewar prices. Most of the increases in price had occurred before the outbreak of hostilities in Korea in June 1950, but there were rather substantial increases in the last half of 1950. From January 1, 1951, to September 1955, prices of machinery showed little change. In the last quarter of 1955, manufacturers of farm machinery increased prices to dealers by about 4 percent and there have been similar increases in dealers' list prices.

Although dealers' list prices of farm machines and equipment are now higher than for any previous year, many dealers are continuing the practice of recent years of allowing more than the market value for trade-ins and by giving discounts for cash sales.

Farmers' purchases of new machines and equipment have been of large volume for more than a decade. Substantial numbers of these purchases were made to replace animal power and animal-drawn machines. With the power machines and equipment, work capacity was increased greatly and there have been substantial reductions in the number of farmers and in the farm labor force.

Numbers of wheel tractors on farms are now about 3 times the 1940 figure (table 2). The increase since 1940 has been relatively larger for grain combines, mechanical field type cornpickers, milking machines, pickup balers, and many other important machines, than for farm tractors.

Along with the increase in numbers of machines the trend in recent years has been toward use of larger tractors and equipment. Many farmers have found that the larger equipment permits substantial savings in labor, adds to timeliness in work performance, and often contributes toward lower costs of production. Reports of the Census of Manufacturers show that the bulk of the wheel tractors sold for farm use now have ratings of 35 belt h.p. or more. A decade earlier, most of the tractors sold had ratings of less than 30 belt h.p.

Although many farmers bought new tractors, machines, and equipment in recent years, a substantial number of them have found it necessary to delay their purchases because of limited incomes. This group of farmers continues to use relatively old and often obsolete equipment, or they buy used machines and equipment. Some have made increased use of custom machines. In fact, some farmers with relatively small acreages in crops find it less expensive to hire custom operators to perform most of their fieldwork than to own the machines.

Table 2.- Farm power and machinery and related data, United States, 1940-55

Index numbers (1947-49=100)

Year	Number on farms, January 1 1/						Volume on farms, January 1 2/	
	Horses and mules all ages	Work-stock 3 years old and over	Colts under 1 year of age	Tractors 3/	Auto-mobiles	Motor-trucks	All machinery and equipment other than trac-tors and other motor vehicles	All farm power (including work animals), machinery and equipment
1940	156	144	324	54	97	55	61	81
1941	152	140	314	58	101	58	62	83
1942	147	136	272	65	109	61	68	87
1943	142	134	221	72	101	68	70	88
1944	136	130	198	76	98	73	68	87
1945	128	125	172	83	97	79	73	89
1946	119	117	133	87	99	82	81	92
1947	109	108	112	92	101	90	85	93
1948	100	100	100	99	99	101	99	99
1949	91	92	88	109	100	109	116	108
1950	84	85	74	119	98	117	130	114
1951	76	77	62	129	98	122	141	120
1952	66	67	54	137	99	128	153	125
1953	58	59	49	144	99	133	160	128
1954	51	52	46	149	99	138	162	129
1955	46	47	43	152	99	143	161	129
1956 4/	43	43	43	156				

1/ The 1947-49 average for horses and mules of all ages was 9,302,000; for workstock, 8,492,000; for colts, 233,000; for tractors, 2,852,000; for automobiles, 4,288,000; and for motortrucks, 1,888,000.

2/ In terms of 1935-39 prices.

3/ Excludes garden tractors.

4/ Preliminary.

Retail prices of motor supplies, including chiefly motor fuel, lubricants, and tires are now about the same as a year earlier. However, beginning with this year farmers can obtain a federal tax rebate of 2 cents a gallon for off-highway uses of gasoline. It is estimated that the rebate will approximate $60 million a year.

FEED

Prices paid by farmers for feed and prices received by farmers for feed grains and hay were down 7 percent in April from a year earlier (table 3). For the next few months, prices of feed may not average greatly different from those of a year ago.

Returns per $1.00 of feed cost were higher in mid-April than they were a year earlier for milk, butterfat, eggs and turkeys and were lower for hogs, broilers, sheep, and beef cattle (table 4). Returns from feeding cattle bought in the last half of 1955 are expected to be above the returns from those purchased a year earlier. Returns per $1.00 of feed cost were average or above in April 1956 for only 3 of 9 livestock and poultry enterprises. The index of prices of all livestock and livestock products on April 15 was down about 6 percent from a year earlier. Prices were lower for all livestock and livestock products, except dairy products, eggs, and turkeys. Percentagewise, the drop was greatest for broilers and hogs. The price of wool also declined considerably but this will be more than offset by Government payments later this year on the 1955 wool clip.

The supply of feed grains for the 1955-56 feeding year was 8 percent above a year earlier--more than ample for all current needs. Stocks of feed grains on January 1, 1956, were 7 percent larger than on January 1, 1955. The carryover next fall probably will be a little larger than the record stocks of a year earlier.

In total, there are around 3 to 4 percent more grain-consuming livestock in the current feeding year, which began October 1, 1955. Compared with a year earlier, on January 1, 1956, the number of milk cows was down less than 1 percent; that of cattle on feed was up less than 1 percent; that of other beef cattle was up 2 percent; the number of hens and pullets on farms was down 2 percent; and the number of horses and mules was down 8 percent. The number of cattle on feed on April 1 in 14 principal States was 8 percent below a year ago. It is expected that broiler production may be up 20 percent and turkeys raised may be up 10 percent in 1956 compared with 1955. More of the heavy breed turkeys are expected and fewer of the light breed turkeys. Farm chickens for replacement may be up from 5 to 8 percent. The fall pig crop of 1955 was 12 percent above a year earlier, but it is expected that the spring pig crop of 1956 may be down 5 percent from a year earlier.

The supply of hay on January 1, 1956, estimated at 74 million tons, was about 2 percent larger than a year earlier, and the number of roughage-consuming animals was about the same. Numbers of these animals have

Table 3.- Average prices of feed in the United States, April 15, 1956, with comparisons

Item and unit	April 15, 1954	April 15, 1955	October 15, 1955	April 15, 1956
	Dollars	Dollars	Dollars	Dollars
Prices received by farmers:				
Corn, per bu.	1.45	1.36	1.14	1.32
Oats, per bu.	.78	.73	.59	.62
Barley, per bu.	1.10	1.07	.91	.95
Sorghum grain, per 100 lbs.	2.43	2.23	1.63	1.93
Hay, baled, per ton	22.80	22.40	20.50	21.00
Prices paid by farmers:				
Mixed dairy feed 16 pct. protein, per 100 lbs.	4.01	3.79	3.58	3.62
Laying mash, per 100 lbs.	5.01	4.70	4.47	4.42
Broiler mash, per 100 lbs.	5.41	5.13	4.88	4.91
Cottonseed meal, per 100 lbs.	4.28	4.26	3.81	3.65
Soybean meal, per 100 lbs.	5.53	4.49	4.32	3.92
Linseed meal, per 100 lbs.	5.01	4.56	4.47	4.16
Meat scrap, per 100 lbs.	5.98	5.11	4.98	4.45
Bran, per 100 lbs.	3.51	3.08	2.87	3.02
Middlings, per 100 lbs.	3.59	3.24	3.05	3.10
Alfalfa hay, baled, per ton	35.10	35.40	32.60	32.50
Average value of concentrate ration fed to poultry and milk cows: 1/				
Fed to poultry, per 100 lbs.	3.93	3.73	3.44	3.51
Fed to milk cows, in milk-selling areas, per 100 lbs.	3.44	3.27	3.04	3.05
Fed to milk cows in cream-selling areas, per 100 lbs.	3.04	2.87	2.65	2.67
	Index numbers (1947-49=100)			
Prices received by farmers for feed grains and hay	90	86	73	80
Prices paid by farmers for feed	100	95	87	88

1/ Value of the corn, oats, oilmeal, millfeed, commercial mixed feed, etc., that make up 100 pounds of "grain" ration.

Agricultural Marketing Service.

Table 4.- Returns per $1.00 of feed cost for livestock enterprises, United States, April 15, 1956, with comparisons 1/

Livestock enterprise or product	1937-51 average April	April 15, 1954	April 15, 1955	October 15, 1955	April 15, 1956
	Dollars	Dollars	Dollars	Dollars	Dollars
Eggs	1.48	1.27	1.37	1.78	1.57
Broilers	1.63	1.38	1.84	1.53	1.39
Turkeys	1.75	1.77	1.68	1.93	1.85
Milk	1.83	1.58	1.67	2.10	1.83
Butterfat	1.49	1.19	1.25	1.39	1.36
Hogs	1.57	2.20	1.50	1.54	1.34
Sheep raising	1.60	1.46	1.33	1.28	1.28
Beef raising	1.76	1.51	1.55	1.60	1.46
Cattle feeding	2/1.25	1953-54 1.46	1954-55 1.19		1955-56 3/
	Index numbers (1937-51=100)				
Eggs	100	86	93	85	106
Broilers	100	85	113	94	85
Turkeys	100	101	96	104	106
Milk	100	86	91	93	100
Butterfat	100	80	84	79	91
Hogs	100	140	96	88	85
Sheep raising	100	91	83	76	80
Beef raising	100	86	88	88	83
Cattle feeding	100	1953-54 117	1954-55 95		1955-56 3/

1/ Quantities of feed used in calculating the cost of feed follow: Per dozen eggs - 7 lbs. poultry ration; per lb. of broiler - 4-1/2 lbs. chick starter, 3 lbs. broiler mash, 1952-56; per lb. of turkey - 4-3/4 lbs. poultry ration, 1950-56; per 100 lbs. of hogs - 7-1/2 bu. corn plus 20 lbs. soybean meal; per 100 lbs. of milk - 31 lbs. concentrate ration fed to milk cows in milk-selling areas plus the value of 110 lbs. hay; per lb. of butterfat - 7-1/2 lbs. concentrate ration fed to milk cows in cream-selling areas plus the value of 27-1/2 lbs. hay in Minnesota and Iowa; per 100 lbs. of beef cattle - 3 bu. corn plus 600 lbs. hay; per 100 lbs. of sheep and lambs - 2 bu. corn plus 1,500 lbs. hay. Assumed 19 lbs. wool produced for each 100 lbs. sheep and lamb produced. The quantity of hay for milk cows, beef cattle, and sheep includes an allowance for silage and pasture. Feed nutrients from pasture assumed to cost one-fourth as much as nutrients from hay. Cattle feeding returns are based on table 1, Livestock and Meat Situation, A.M.S., August 15, 1955, which is based on Corn Belt experience.

2/ 1920-52 average.

3/ Season not completed.

increased for several years, but they are still below the 3 previous peaks reached in 1919, 1934, and 1944. The disappearance of hay up to January 1 was about average per animal unit, but larger than a year ago. In most of the Southern States, stocks of hay were larger than last year and more nearly average.

SEED

The index of prices paid by farmers for seed was 18 percent lower in mid-April than a year earlier. Only two seeds--crested wheatgrass and smooth brome--are significantly higher in price this year than last.

Supplies for seeding this spring relative to average requirements are largest for alfalfa, ryegrass, Sudangrass, lespedeza, tall fescue, timothy, and Kentucky bluegrass. In shortest supply relative to average requirements are redtop, sweetclover, crested wheatgrass, white clover, and smooth brome.

FERTILIZER

The index of prices paid by farmers for fertilizer declined 2 percent in the year ended April 15. It is now about 3 percent below the 1953 peak, 5 percent above the 1947-49 level, and 48 percent above the 1935-39 level.

Fertilizer prices have advanced more slowly than other cost rates in the last 20 years. This is especially true of the newer nitrogen fertilizers. A pound of nitrogen in the form of anhydrous ammonia, for example, costs less today than nitrogen in the form of nitrate of soda did in 1935-39 (fig. 4). The price of land, on the other hand, has gone up 150 percent while cost rates in general and prices of farm products have more than doubled since the period 1935-39. Various other materials that are derived from anhydrous ammonia such as ammonium nitrate, urea, and nitrogen solutions are also relatively cheap sources of nitrogen, and in some instances may be cheaper than anhydrous ammonia when differences in cost of application are taken into account. (For more information on the place of nitrogen in farming today, see page 28.)

Farmers are using about 3½ times as many tons of plant nutrients as they used in 1940. Fertilizer shipments in the year ended June 30, 1955, contained 4.7 times as much nitrogen (N), 2.5 times as much available phosphate (P_2O_5), and 4.2 times as much potash (K_2O) as were present in fertilizers shipped in 1939-40 (fig. 5). In the last few years the quantity of nitrogen and potash used by farmers has continued to increase but the quantity of available phosphate has declined slightly.

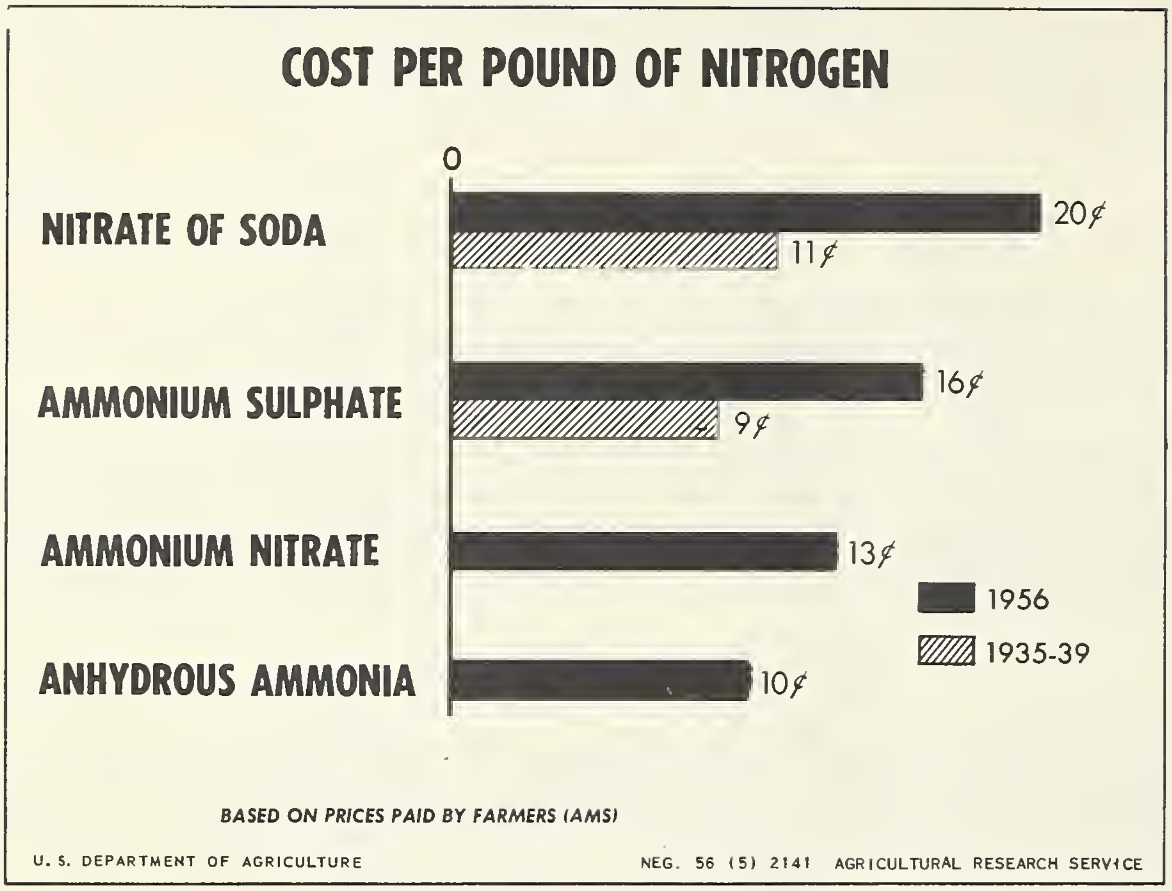


Figure 4

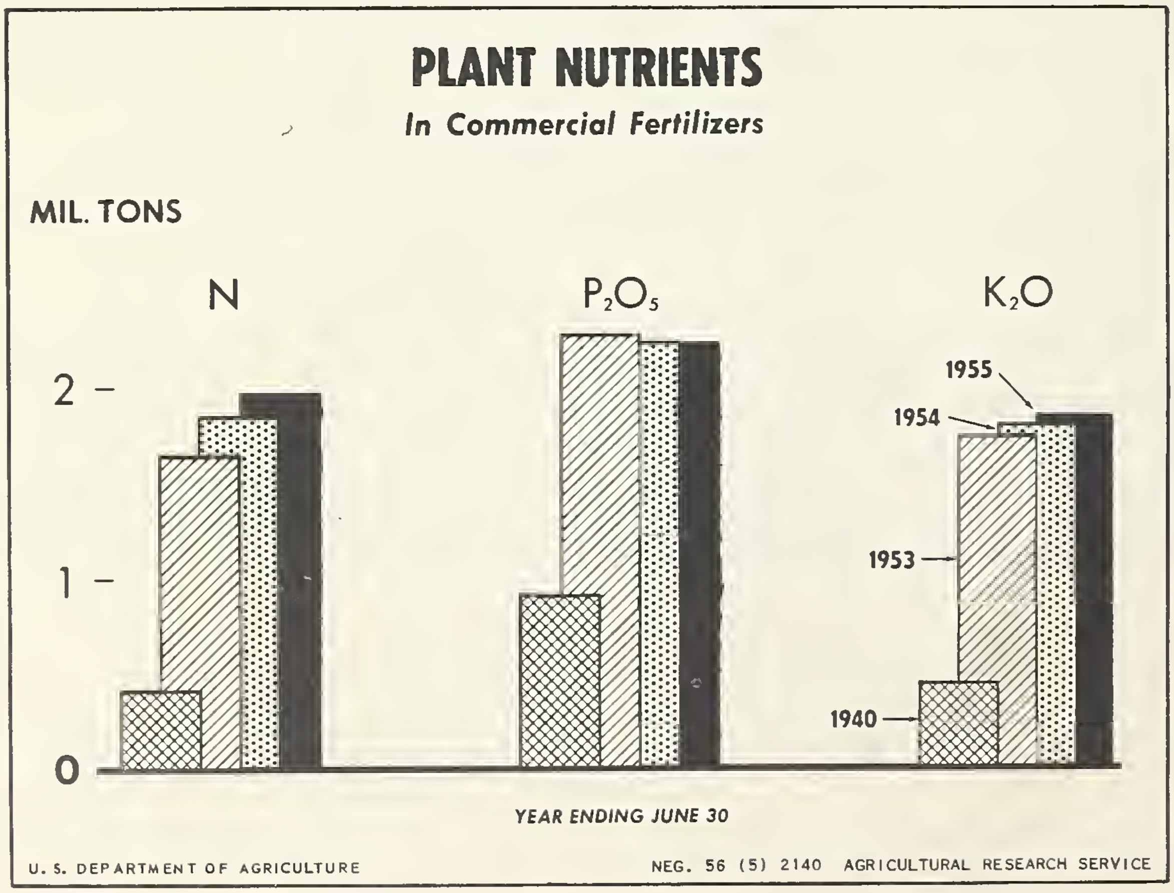


Figure 5

BUILDING MATERIALS

Prices paid by farmers for building and fencing materials were 4 percent higher in mid-March than a year earlier. Increases in the price of lumber ranged from $2 to $9 per 1,000 board feed. Cement advanced 7 cents a bag, and barbed wire 50 cents a spool.

Prices paid by farmers for building and fencing materials on March 15 were about 22 percent above the average for 1947-49 and 155 percent above the average for 1935-39.

FARM SUPPLIES

Prices paid by farmers for farm supplies in mid-March were about 1 percent higher this spring than they were a year ago. They are 17 percent above the 1947-49 average and 96 percent above the 1935-39 average.

Among the important items in this particular category of cost factors are baler twine and wire, binder twine, bale ties, and containers. Most purchases of these items are made later in the year and for that reason the Department does not attempt to get information on prices paid for all of these items on the March 15 schedule. Prices of bushel baskets were 4 percent higher and prices of hoes were 5 percent higher in mid-March than a year earlier.

PESTICIDES

Prices of several important pesticides are slightly lower than they were last fall or a year ago. Manufacturers' prices of benzene hexachloride, DDT, calcium arsenate, 2,4-D and 2,4,5-T are all lower. An important exception is the increase of about 60 percent in the price of copper sulfate.

Demand for pesticides may be strong during 1956 because of the high rate of survival of hibernating boll weevils in the Cotton Belt. Surveys in North Carolina, South Carolina, Georgia, and Louisiana indicate at least twice as many surviving weevils this spring as a year ago. In some counties, the survival rate was 6 or 7 times as high as last year.

An amendment to the Food, Drug and Cosmetics Act is likely to promote the use of materials such as pyrethrum and rotenone which leave little toxic residue on crops to which they are applied.

Total stocks of pesticides held by manufacturers at the end of the 1955 season were practically unchanged from a year earlier. Stocks of benzene hexachloride, and calcium arsenate were considerably lower than a year earlier, but stocks of a group of commodities, including captan, malathion, methoxychlor and parathion, and 2,4-D, were higher.

FARM REAL ESTATE

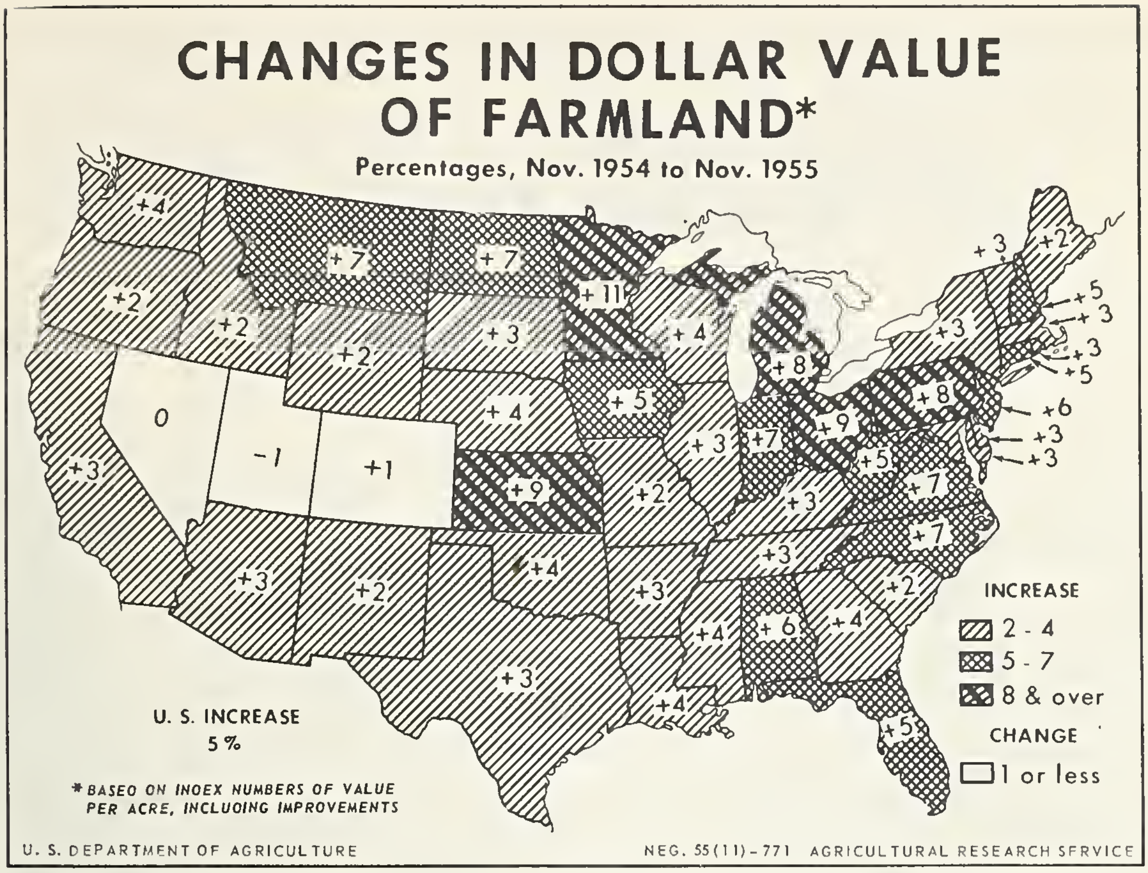
Market prices of farm real estate continued to advance during 1955. Last November they reached a new record high that was 37 percent above 1947-49. Prices rose 5 percent or more in 17 States during the year ended November 1955. Largest gains occurred in Minnesota, up 11 percent, Kansas and Ohio, 9 percent, and Pennsylvania and Michigan up 8 percent. Only 3 States--Nevada, Utah, and Colorado--showed no significant change (fig. 6). Nationally, values advanced an average of 5 percent.

Preliminary indications as of March 1, 1956, are that land values dipped slightly from their November 1955 level in the central part of the country, but continued to advance in the Southeast, eastern Corn Belt, California, and Florida. The national average for March 1, 1956, is likely to be up slightly from last November.

The current strength in prices of farm real estate which began in the first half of 1954, poses difficult problems for landowners and prospective buyers with respect to decisions to buy or sell farmland in view of the high costs of production and the decline in farm income. Many adjustments have been necessary in the combination of agricultural resources in order to achieve more efficient production. Some of these, such as additional fertilizer, better seed, and more efficient feeding and management practices, can be made without increasing the amount of available land, machinery, and equipment. However, many thousands of commercial farms are still below the optimum acreage needed to utilize fully the available labor and equipment. In these situations costs per unit often can be reduced substantially by enlarging the operating unit. To an increasing extent, farmers have chosen to follow this course of action by buying or renting more land, and strong competition has developed for the limited number of farms available for purchase or rental. Census data show, for example, that although the total number of farms declined sharply between 1950 and 1954, the number of owners who rented additional land continued to increase. Sales data show a steady increase during this period in the proportion of all farm transfers that were for farm enlargement. In some areas, a third to two-fifths of all transfers have been for this purpose.

Many established farmers are in favorable position to finance the purchase of additional land, either from savings from past farming operations, or by a mortgage on their total holdings. The purchase of additional land often provides the most direct means of reducing unit costs and thereby maintaining or increasing total net income. A price for an additional tract in excess of its long-term earnings as a separate tract would be justified in such circumstances because the increased earnings from the enlarged farm could be used to meet debt obligations.

The current record level of farm real estate prices creates difficult problems for beginning farmers. Initial capital requirements, for both land and equipment, have mounted steadily in recent years until for many they are at a prohibitive level. Special credit programs, supervised management, and loan guarantees help to strengthen the competitive position of low-equity buyers.


CHANGES IN DOLLAR VALUE OF FARMLAND*
Percentages, Nov. 1954 to Nov. 1955
+4
+2
+2
+7
+7
+11
+2
+3
+4
+3
+2
0
-1
+1
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+5
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INCREASE
▨ 2 - 4
▩ 5 - 7
▩ 8 & over
CHANGE
☐ 1 or less
U. S. INCREASE
5 %
* BASED ON INDEX NUMBERS OF VALUE PER ACRE, INCLUDING IMPROVEMENTS
U. S. DEPARTMENT OF AGRICULTURE
NEG. 55(11)-771 AGRICULTURAL RESEARCH SERVICE

Figure 6

Cash Rents

Although the major proportion of rents paid for farms are based on a share of the crops, or a share of crops and livestock, cash rents for hay and pasture are paid in addition on a substantial proportion of rented farms in the North Central region. Half or more of all share tenants in South Dakota, Nebraska, Kansas, Illinois, and Iowa paid some cash in 1954. The rate paid per acre for pasture has increased steadily since 1940. The increase from 1955 to 1956 was about the same as for the preceding years (table 5). Highest rates, averaging about $7.50 per acre, were reported for Iowa, Illinois, Ohio, and Indiana where much of the pasture is cropland and where the carrying capacity of pasture is high. Rents are lowest in the Dakotas and in Nebraska and Kansas.

The practice of renting an entire farm for cash has declined in importance steadily in recent decades, and this trend continued in 1950-54. About one-fifth of all tenants in Wisconsin, Minnesota, and Michigan were cash tenants in 1954, whereas the proportion did not exceed 10 percent in most other North Central States. Although the rate per acre is higher than for pastureland, cash rents for farms have also risen steadily, and the increase continued in 1956. Rents of $10 or more per acre were reported this spring in more than half of the States in the region (table 6).

Table 5.- Cash rent per acre for pastureland and ratio of gross rent to value, Corn Belt, Lake, and Northern Plains States, 1953-56 1/

State	Cash rent per acre				Ratio of gross rent to value			
	1953	1954	1955	1956	1953	1954	1955	1956
	Dollars	Dollars	Dollars	Dollars	Percent	Percent	Percent	Percent
Ohio	5.30	6.50	6.60	7.00	5.4	5.1	5.2	5.7
Indiana	6.40	6.95	6.90	7.40	3.9	4.5	4.3	4.4
Illinois	7.40	7.65	7.60	7.85	3.3	3.4	3.6	3.8
Iowa	7.95	8.05	8.25	8.70	5.2	5.4	5.1	5.7
Missouri	4.50	4.20	4.35	5.10	6.3	6.0	5.7	7.3
Michigan	3.00	3.40	3.45	4.20	5.3	5.6	5.6	5.6
Wisconsin	4.40	4.50	5.40	5.20	7.9	8.6	9.1	8.9
Minnesota	4.90	5.10	5.05	5.45	6.4	6.6	6.6	7.4
North Dakota	1.10	1.20	1.15	1.25	5.4	5.5	5.5	5.8
South Dakota	1.75	1.80	1.90	1.85	5.1	5.5	5.6	5.7
Nebraska	3.75	3.65	3.90	3.85	5.8	5.7	5.8	5.9
Kansas	3.20	3.20	3.45	3.55	5.3	5.8	5.8	5.9

1/ Estimates supplied by crop reporters, as of April 1, for calendar years indicated.

Table 6.- Cash rent per acre for farms rented wholly for cash, and ratio of gross cash rent to value, Corn Belt, Lake and Northern Plains States, 1953-56 1/

State	Cash rent per acre				Ratio of gross rent to value			
	1953	1954	1955	1956	1953	1954	1955	1956
	Dollars	Dollars	Dollars	Dollars	Percent	Percent	Percent	Percent
Ohio	9.30	9.70	10.45	10.70	5.6	5.2	5.4	5.5
Indiana	13.00	13.85	12.95	14.70	6.5	6.9	5.8	6.6
Illinois	15.10	15.90	16.50	17.25	5.5	5.6	5.6	5.7
Iowa	13.35	13.50	14.05	14.85	5.9	6.1	6.0	6.2
Missouri	6.80	6.70	7.10	7.50	7.1	6.8	6.8	6.9
Michigan	8.90	9.10	9.00	10.25	6.1	6.5	6.4	6.3
Wisconsin	11.20	10.80	11.30	11.75	8.3	8.7	8.1	8.5
Minnesota	9.30	9.45	9.90	10.90	6.8	6.9	6.8	7.1
North Dakota	2.75	3.00	2.70	3.30	7.2	7.6	7.6	8.4
South Dakota	4.20	4.10	4.30	4.65	6.8	7.1	7.5	8.1
Nebraska	5.40	5.90	6.50	6.15	5.7	6.1	6.4	6.0
Kansas	5.85	5.40	5.65	6.05	6.5	6.4	6.1	6.4

1/ Estimates supplied by crop reporters, as of April, for calendar years indicated.

Both pasture rents and farm rents have held about steady in relation to the market value of the land so rented. The ratio of gross cash rent per acre to value shown in tables 5 and 6 applied to the estimated market value of the land in a particular farm provides a general guide as to what the cash rental rate would be for the 1956 season.

INTEREST, TAXES AND INSURANCE

Interest

The interest paid by farmers in 1955 on all types of debt totaled about $950 million, approximately 7 percent more than in 1954. In 1956 interest charges will probably reach $1 billion. This rise in interest cost resulted primarily from an expansion in the amount of credit that farmers used. A small increase in interest rates was also a factor.

Both real-estate and non-real-estate debt of farmers rose during 1955--about 10 percent and 8 percent respectively. The several factors that were responsible for this increase included the cost-price squeeze that farmers have faced. This caused a rise in loans for production expenditures and increased financing of improvements and additional land that some farmers believed were necessary to maintain efficiency and incomes. A further expansion of debt, stemming in part from these same factors, is expected in 1956. At the beginning of 1956, farm real-estate debt totaled about $9.0 billion and non-real-estate debt, about $7.9 billion.

During the early months of 1956, open-market money rates rose, and credit in general tightened. This may tend to cause interest rates on loans to farmers to rise and loan funds for some lenders to be more restricted. However, farmers may not experience much change in the cost or availability of credit.

Taxes

Preliminary reports indicate that State and local property taxes paid by farmers in 1956 (levied mainly in 1955) will be about 3 percent greater than they were in 1955. Taxes levied on farm real estate are expected to be about 6 percent greater, whereas taxes levied on personal property are expected to be about 3 percent less than they were in 1955.

Because of increased coverage of hired farm workers under the Old Age and Survivors Insurance program in 1955, taxes payable by their employers will be about 3 times as high in 1956 as in any previous year. It has been estimated that the employer's share of the tax payable in 1956 will be about $40 million.

Insurance

Complete information is not available on the cost of all insurance carried by farmers; but the amount of insurance on farm property continued to increase during 1955, and it will probably be still higher in 1956. The net cost to farmers probably will increase also because of the higher amounts of insurance carried, even though assessment rates change very little.

Premiums and assessments paid to farm mutual insurance companies in 1955 amounted to about $95 million, for more than $30 billion of fire insurance. About $57 million was paid out for losses sustained by members and $27 million for operating expenses, and $10 million was added to their safety funds or reserves.

Farmers have also increased the amount of their insurance against loss from hail damage to growing crops each year since 1950. They paid about $75 million in premiums for about $2 billion worth of such insurance in 1955, and they received about $45 million in payments for crop-hail losses. The amount of hail insurance will likely increase in 1956, but the net cost to farmers (premiums minus losses) will depend largely on the extent of hail damage to the insured crops.

Farmers also pay more than $20 million a year for premiums on all-risk Federal crop insurance. Since 1950, payments received by farmers for crop losses have been substantially equal to premium costs.

PRODUCTION COSTS ON 23 IMPORTANT TYPES OF FARMS [1]

Wylie D. Goodsell
Production Economics Research Branch, Agricultural Research Service

Prices paid by farmers for goods and services used in production, including wage rates, interest, and taxes, rose about 12 percent from 1947-49 to 1955 for farmers as a whole in the United States. From 1954 to 1955 the index of these prices remained unchanged.

Although the overall pattern of prices and cost rates reflects the average situation for farmers in the United States as a group, many important differences exist among types of farms in different areas throughout the country. From 1947-49 to 1955, for example, increases in prices paid for goods and services used in production including wage rates and taxes ranged from 1 percent on irrigated cotton farms in the High Plains of Texas to 23 percent on cash grain farms in the Corn Belt (table 7). Among 23 important types of farms studied, 14 had increases in prices and cost rates paid of 15 percent or more. Only 6 of the 23 types of farms had increases of less than 10 percent from 1947-49 to 1955.

Changes in prices and cost rates paid by operators differed considerably from 1954 to 1955. They averaged higher on 10 types of farms, lower on 10 types, and remained unchanged on 3 types. The greatest increase, about 9 percent, occurred on southern Piedmont cotton farms and the greatest decrease, about 5 percent, occurred on cattle ranches in the Southwest.

Why Costs Vary Among Farms

There are several reasons why changes in cost rates and prices paid by farmers who operate various types of farms differ. Two important reasons are: (1) Certain expenditure items are relatively more important on some types of farms than on others. (2) Prices paid for some items change relatively more than prices paid for other items from year to year and over the longer time.

Expenditures for hired labor comprised from around a fifth to a third of total cash expenditures on cotton and tobacco farms and less than 10 percent on most dairy, Corn Belt, and wheat farms. Expenditures for power and and machinery in 1955 ranged from 15 percent of total cash expenditures on southwestern sheep ranches to 66 percent on wheat-small grain-livestock

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[1] Additional detail is given in "Costs and Returns, 1955 (with comparisons) Commercial Family-Operated Farms, by Types and Location". U. S. Dept. of Agr., Agr. Inform. Bul.-- (In Process)

Table 7.- Prices paid by farmers, and related data, commercial family-operated farms, by type, 1955

Type of farm and location	Prices or rates paid				Relative importance 1/		
	Goods and services	Hired labor	Feed, seed and livestock	Nonfarm goods and services	Hired labor	Feed, seed and livestock	Nonfarm goods and services
	Index numbers (1947-49=100)				Percent	Percent	Percent
Dairy farms:							
Central Northeast	107	142	89	121	8	39	53
Eastern Wisconsin	115	123	92	122	5	20	75
Western Wisconsin	117	123	93	127	6	22	72
Corn Belt farms:							
Hog-dairy	113	124	94	121	9	25	66
Hog-beef raising	113	128	92	124	7	29	64
Hog-beef fattening	103	123	92	123	5	59	36
Cash grain	123	133	99	128	6	14	80
Tobacco farms:							
Tobacco-livestock (Kentucky)	118	113	94	123	21	10	69
Tobacco-cotton (North Carolina)	119	2/123	106	119	36	5	59
Cotton:							
Southern Piedmont	118	2/153	95	109	29	8	63
Black Prairie, Texas	110	99	98	119	30	9	61
High Plains, Texas (nonirrigated)	109	84	97	119	17	7	76
High Plains, Texas (irrigated)	101	90	91	108	28	3	69
Spring wheat farms (Northern Plains):							
Wheat-small grain-livestock	116	104	87	120	10	5	85
Wheat-corn-livestock	117	106	96	130	8	13	79
Wheat-roughage-livestock	115	104	86	122	4	12	84
Winter wheat farms:							
Southern Plains	120	118	96	126	6	14	80
Wheat-pea (Washington and Idaho)	118	135	95	118	13	6	81
Sheep ranches:							
Northern Plains	116	124	101	125	25	31	44
Southwest	103	3/	3/	3/	13	50	37
Cattle ranches:							
Northern Plains	121	128	111	121	14	12	74
Intermountain	121	144	115	121	12	31	57
Southwest	104	117	94	114	7	47	46

1/ Based on 1955 expenditures. 2/ Includes cropper labor. 3/ Not available.

farms in the Northern Plains. Prices paid for machinery were slightly higher in 1955 than in other recent years.

Closely associated with these observations is the fact that adjustments to reduce certain inputs have been much greater on some types of farms than on others. For example, in 1955 winter wheat farmers used around 30 percent less labor per acre of land than they used in 1937-41, whereas Corn Belt farmers and livestock ranchers used around 10 percent less labor per acre of land. However, in 1955, winter wheat farmers had from $2,200 to $3,500 of total capital (based on 1947-49 dollars) per 100 hours of man labor compared with around $1,000 to $2,000 for Corn Belt farmers and livestock ranchers.

Expenditure for Nonfarm Goods and Services have Increased

With the shift from farm produced animal power to various kinds of labor-saving mechanical power, farmers generally have stepped up total production, production per hour of man labor, and production per unit of input. However, they have become more dependent on industry for items used in production. In 1955, expenditures for nonfarm goods and services used in production averaged 69 percent of total cash expenditures on tobacco-livestock farms in Kentucky and 80 percent on cash grain farms in the Corn Belt and on winter wheat farms in the Southern Plains. In the 1930's, expenditures for nonfarm items averaged around 57 percent on tobacco-livestock farms and 75 percent on cash grain and winter wheat farms. Of the 23 types of farms studied, cash expenditures for nonfarm goods and services exceeded 50 percent of the total cash outlay on 19 types of farms. Expenditures for nonfarm goods and services exceeded two-thirds of the total cash expenditures on 13 of the 23 types of farms.

Costs of Production Have Risen on Most Farms

Total cost per unit of production was higher in 1955 than in 1947-49 on 19 of the 23 types of farms studied (table 8). The reductions in resources required per unit of product generally have not offset the increases in cost rates and prices paid. Changes in production costs per unit ranged from a decrease of approximately 11 percent on wheat-small grain-livestock farms in the Northern Plains to an increase of 49 percent on winter wheat farms in the Southern Plains.

Production costs not only vary among the different types of farms--they differ significantly from year to year on the same farm. Prices and cost rates, yields, and efficiencies change from year to year, and changes in these factors materially affect unit costs of production. For example, the index of total cost per unit of production on Piedmont cotton farms was nearly 21 percent lower in 1955 than in 1954, despite about 9 percent higher cost rates and prices paid in 1955 (tables 8 and 9). Crop yields were nearly 56 percent higher and production per unit of input was nearly a third higher in 1955 than in 1954.

Table 8.- Cost of production, and related data, commercial family-operated farms, by type, 1955 1/

Type of farm and location	Per unit of production		Prices and rates paid 4/	Crop yields	Net farm production	Production	
	Total cost 2/	Operating expense 3/				Per hour of labor	Per unit of input
	Index numbers (1947-49=100)						
Dairy farms:							
Central Northeast	96	92	107	116	134	157	119
Eastern Wisconsin	108	115	115	121	113	138	108
Western Wisconsin	98	107	117	124	125	147	120
Corn Belt farms:							
Hog-dairy	108	106	113	109	122	124	111
Hog-beef raising	106	96	113	114	127	114	112
Hog-beef fattening	112	114	103	102	107	114	99
Cash grain	123	127	123	116	116	118	103
Tobacco farms:							
Tobacco-livestock (Kentucky)	129	130	118	113	97	107	93
Tobacco-cotton (North Carolina)	115	115	119	112	107	117	105
Cotton farms:							
Southern Piedmont	96	99	118	140	145	142	127
Black Prairie, Texas	104	102	110	131	119	146	114
High Plains, Texas (nonirrigated)	135	124	109	66	68	97	77
High Plains, Texas (irrigated)	123	119	101	127	118	102	89
Spring wheat farms (Northern Plains):							
Wheat-small grain-livestock	89	87	116	123	139	139	126
Wheat-corn-livestock	125	126	117	94	100	98	90
Wheat-roughage-livestock	101	104	115	121	133	119	109
Winter wheat farms:							
Southern Plains	149	142	120	92	78	95	79
Wheat-pea (Washington and Idaho)	131	131	118	116	112	106	93
Sheep ranches:							
Northern Plains	117	122	116	101	111	103	99
Southwest	124	112	103	133	99	108	87
Cattle ranches:							
Northern Plains	120	127	121	100	103	100	97
Intermountain	120	159	121	95	113	112	97
Southwest	126	112	104	118	97	107	87

1/ Preliminary. 2/ Includes charges for capital and unpaid labor. 3/ Includes property taxes but no interest. 4/ From table 7.

Table 9.- Cost of production, and related data, commercial family-operated farms, by type, 1954 1/

Type of farm and location	Per unit of production		Prices and rates paid	Crop yields	Net farm production	Production	
	Total cost 2/	Operating expense 3/				Per hour of labor	Per unit of input
	Index numbers (1947-49=100)						
Dairy farms:							
Central Northeast	101	97	109	113	126	148	114
Eastern Wisconsin	108	114	117	122	113	132	108
Western Wisconsin	103	114	118	112	118	135	114
Corn Belt farms:							
Hog-dairy	103	102	113	124	125	130	116
Hog-beef raising	119	117	114	90	107	102	99
Hog-beef fattening	110	114	105	110	110	118	101
Cash grain	123	127	121	112	111	116	102
Tobacco farms:							
Tobacco-livestock (Kentucky)	112	114	121	122	116	120	109
Tobacco-cotton (North Carolina)	128	131	118	100	102	107	93
Cotton farms:							
Southern Piedmont	119	121	108	90	110	113	96
Black Prairie, Texas	138	125	111	80	80	112	86
High Plains, Texas (nonirrigated)	125	115	104	79	72	100	81
High Plains, Texas (irrigated)	113	109	99	135	124	111	94
Spring wheat farms (Northern Plains):							
Wheat-small grain-livestock	137	129	116	72	87	87	82
Wheat-corn-livestock	123	121	117	95	101	101	93
Wheat-roughage-livestock	125	125	113	92	104	96	89
Winter wheat farms:							
Southern Plains	125	121	117	88	92	106	91
Wheat-pea (Washington and Idaho)	98	100	120	150	143	136	124
Sheep ranches:							
Northern Plains	121	122	117	91	109	100	97
Southwest	137	127	97	119	73	87	77
Cattle ranches:							
Northern Plains	108	118	119	91	113	110	104
Intermountain	123	168	115	92	104	106	91
Southwest	149	135	110	104	80	86	76

1/ Revised. 2/ Includes charges for capital and unpaid labor. 3/ Includes property taxes but no interest.

Changes in output of livestock, crop yields, overall production efficiency, and cost rates and prices paid help to explain why production costs increased or decreased more on some farms than on others. The greatest increase from 1947-49 to 1955 in total costs per unit of production took place on winter wheat farms in the Southern Plains. In 1955, crop yields and total production were well below the 1947-49 averages and cost rates and prices paid averaged a fifth higher on winter wheat farms. Decreases took place on wheat-small grain-livestock farms, Southern Piedmont cotton farms, and central Northeast dairy farms. Crop yields and production were record high in 1955 on Piedmont cotton farms. However, cost rates and prices paid averaged nearly a fifth higher in 1955 on Piedmont cotton farms.

Operating expense (cash expenditures including depreciation) per unit of production also was higher in 1955 than in 1947-49 on 19 of the 23 types of farms. Increases in operating costs per unit of production on winter wheat farms were exceeded only by increases on cattle ranches in the Intermountain region. Despite low crop and pasture yields, cattle ranchers kept production up in 1955 by relatively high expenditures for feed. Cost rates and prices paid by these ranchers in 1955 averaged a fifth higher than in 1947-49.

Operating expense per dollar of gross farm income, a common measure of changes in profitability, ranged from 48 cents on wheat-pea farms in Washington and Idaho to 80 cents on sheep ranches in the Southwest. Operating expense per dollar of gross farm income ranged between 55 and 65 cents on most types of farms (table 10). The variation was much less in 1955 than in most years. Gross farm income per dollar of estimated capital investment ranged from around 10 cents on sheep and cattle ranches in the Southern Plains to nearly 40 cents on central Northeast dairy farms and tobacco-cotton farms in the Coastal Plains of North Carolina. It ranged from 15 to 30 cents on 15 of the 23 types of farms studied.

Table 10.- Costs and returns per farm, commercial family-operated farms, by type, 1955 1/

Type of farm and location	Farmland		Farm labor		Total farm capital January 1	Gross farm income	Operating expense	Net farm income
	Total	Cropland harvested	Total	Hired				
	Acres	Acres	Hours	Hours	Dollars	Dollars	Dollars	Dollars
Dairy farms:								
Central Northeast	201	77	4,450	710	26,000	10,122	5,689	4,433
Eastern Wisconsin	127	67	4,360	520	33,070	7,427	4,588	2,839
Western Wisconsin	143	61	4,040	490	21,890	6,145	3,741	2,404
Corn Belt farms:								
Hog-dairy	163	101	4,490	580	43,530	10,091	5,902	4,189
Hog-beef raising	218	101	3,760	260	34,790	6,513	3,527	2,986
Hog-beef fattening	199	138	4,180	670	60,960	16,266	12,404	3,862
Cash grain	230	192	3,390	470	89,300	13,291	6,924	6,367
Tobacco farms:								
Tobacco-livestock (Kentucky)	116	31	3,780	1/1,090	23,590	5,539	2,689	2,850
Tobacco-cotton (North Carolina)	100	40	6,800	1/3,880	20,740	8,049	4,760	3,289
Cotton farms:								
Southern Piedmont	177	58	4,560	1/1,960	15,510	5,134	2,894	2,240
Black Prairie, Texas	171	103	4,120	1,640	26,410	6,608	3,636	2,972
High Plains, Texas (nonirrigated)	370	282	3,330	1,210	37,470	7,529	4,815	2,714
High Plains, Texas (irrigated)	314	277	8,150	5,730	86,900	23,076	14,484	8,592
Spring wheat farms (Northern Plains):								
Wheat-small grain-livestock	690	443	3,300	640	41,590	11,397	5,597	5,800
Wheat-corn-livestock	480	328	3,980	480	42,060	7,005	4,687	2,318
Wheat-roughage-livestock	770	413	3,530	230	39,530	9,258	5,139	4,119
Winter wheat farms:								
Southern Plains	714	364	2,480	330	75,450	10,044	4,932	5,112
Wheat-pea (Washington and Idaho)	536	361	3,320	1,020	146,510	20,072	9,660	10,412
Sheep ranches:								
Northern Plains	6,240	237	8,060	3,980	82,240	16,605	12,419	4,186
Southwest	12,805	18	5,330	2,650	177,880	16,913	13,610	3,303
Cattle ranches:								
Northern Plains	4,170	293	4,490	1,220	68,950	8,867	6,323	2,544
Intermountain region	1,695	166	4,860	840	64,760	10,630	6,112	4,518
Southwest	10,610	21	3,590	1,010	129,760	11,233	8,112	3,121

1/ Includes cropper labor.

NITROGEN FERTILIZER IN FARMING TODAY

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Increased use of nitrogen, and of all fertilizers is but one facet of the gain in farm technology that has taken place in recent years. Substantial yield responses to nitrogen focus attention to it, often to the exclusion of other factors in the combination of improved practices that jointly account for increases in yield per acre and in total farm output. Technical gains provide an important means whereby individual farmers in position to adopt them can maintain incomes when costs rise or prices fall. This is true for use of nitrogen as well as for other technical improvements.

More Plant Capacity for Nitrogen

In recent years, plant capacity for manufacture of nitrogen has been greatly increased; much of it from utilizing byproducts of oil refining, so that costs are substantially reduced. The trend is toward lower prices for nitrogen relative to the price of the other principal nutrients in fertilizers. Comparisons of prices paid for nitrogen over time are shown in the fertilizer situation statement earlier in this report. Plant capacity for commercial nitrogen on July 1 will stand at about 3,900,000 tons. This compares with production of about 2,700,000 tons during 1954-55 and 1,450,000 tons in 1950.

Fertilizer Use Rising But Marginal Returns Still High

The use of commercial plant nutrients has steadily expanded since the period immediately preceding World War II. Over most of this period it was apparent that farmers would have used more, particularly nitrogen, had it been available. In more recent years reductions in farm income have not been accompanied by reductions in use of commercial plant nutrients as was true before the war. Measured in terms of plant nutrients, fertilizer consumption has continued to rise during the past 3 years, even with reductions in farm income. The rising plant nutrient content has no doubt been a factor, but it also appears that fertilizer is in a stronger competitive position relative to other inputs than formerly and that farmers are recognizing this fact. Strong yield response of many crops to nitrogen relative to response to other nutrients was well recognized before the more recent declines in its cost relative to the cost of other nutrients.

Notwithstanding the large increase in use of plant nutrients, particularly nitrogen, many farmers are using much less than would represent practical optimum rates for their situations. Even for cotton in the South, estimates of general response indicate that on the average, rates are at a level at which an additional dollar spent for fertilizer would yield an additional return of about five dollars. This is no doubt well below the practical optimum for most farmers and it provides an indication that current rates on many other crops may also be below optimum levels after allowing for risk, uncertainty and restrictions on funds available for fertilizer.

Other Improvements Make Fertilizer More Profitable

Several factors contribute to the relatively high-level use of nitrogen. Changes in technology have been of major importance. Cost per pound of nitrogen has risen relatively little since 1940. But changes in prices of crops have greater effect on net returns per acre than do similar changes in the price paid for nitrogen. Acreage allotments may have had a direct effect in some areas. During the World War II period and before the re-advent of the surplus problem, the generally favorable farm price-cost ratio was undoubtedly the major factor. The ratio was favorable for farming in general, and it was favorable with reference to crop prices and fertilizer costs for the crops on which applications were made.

Improvements in farm technology occurring simultaneously with favorable economic conditions, made fertilizer applications more profitable than formerly. For example, effective insect and disease control has raised recommended and practiced rates of application for crops on which fertilizer has long been used. Higher yielding varieties respond more to fertilizer and to other good practices. Mechanization, through making farm operations more effective and timely, contributes much to the effectiveness of the fertilizer applied.

Production Costs Lower With Fertilizer

The effect of applying nitrogen on cost per unit of production is illustrated in table 11. This is based on estimated yield response of corn to nitrogen on Corn Belt soils of below average fertility, when phosphorus and potassium are applied as needed and other improved practices are followed. For purposes of the illustration, costs per acre other than fertilizer are assumed to be $50.00. Cost of nitrogen is assumed to be $0.14 a pound. The price of corn is assumed to be $1.40 a bushel.

In order to allow for risk and uncertainty, most farmers would apply less than the calculated most profitable rate of about 135 pounds (table 11) even though they would estimate the response to be as indicated in this illustration. Probably a rate of about 90 pounds would be appropriate for many farmers in this situation. The additional cost for the last 30 pounds would be $4.20 but the additional return at 90 pounds, over the 60-pound application would be $8.89. This seems an adequate margin for risk, where response is similar to that shown in table 11. Farmers can see a clear gain in reducing costs per bushel from $1.23 at no application to less than $0.90 a bushel at an application that represents about half the calculated most profitable rate. According to recent estimates, farmers in the area to which table 11 generally applies, are applying about 40 pounds of N per acre. If increased application of nitrogen is combined with other improved practices, farmers could slightly reduce average cost per bushel, substantially increase net returns per acre, and still leave adequate margin for risk, by doubling their current rates of application.

Table 11.- Yields of corn at varying rates of nitrogen, estimated total costs per acre, average cost per bushel, and value of additional yield for each 30 pounds of nitrogen added 1/

Rate of N per acre	Yield per acre	Assumed total cost per acre 2/	Average cost per bushel	Value of additional yield 3/
Pounds	Bushels	Dollars	Dollars	Dollars
0	40.52	50.00	1.23	---
30	56.04	54.20	.97	21.73
60	65.94	58.40	.89	13.86
90	72.29	62.60	.87	8.89
120	76.32	66.80	.88	5.64
150	78.89	71.00	.90	3.60

1/ Based on data from "Profitable Use of Fertilizer in the Mid-West," North Central Regional Publication No. 54, Madison, Wis., December 1954.

2/ Cost of $50.00 per acre without fertilizer is assumed. Each 30-pound unit of N costs $4.20.

3/ The most profitable rate occurs when the value of the additional yield equals the cost of additional fertilizer, or $4.20.

Fertilizer Influences Farming Systems

The place of nitrogen in rotations and effects of its use on cropping systems that would be most profitable, is another aspect of the influence of modern technology as related to current farm problems. The effect of nitrogen on profitability of different rotations must be appraised in relation to other factors such as erosion and other soil characteristics that determine whether productivity can be sustained when nitrogen is substituted for legumes in the rotation. But in some areas where slope and soil characteristics permit, there is evidence that the market value of crop production per 100 acres often is increased when nitrogen is added and the rotation is shortened, in some cases even to the exclusion of legumes.

Where physical factors permit, the choice of rotation for the individual farmer is influenced by the amount of grain sacrificed per pound of forage gained as more forage is included in the rotation. The answer, however, is different, depending on the level of use of fertilizer. Moderate to high rates of fertilizer, particularly nitrogen, increase yields of grain more than they increase yields of forage crops. Thus, as more forage is included in a fertilized rotation, more grain is sacrificed per pound of forage gained, than when more forage is included in the same rotation with little or no application of fertilizer.

An unfertilized rotation in a western Corn Belt experiment showed a higher annual market value of crop production as the acreage of hay was increased to about 30 percent of the cropland, but the value was reduced as more forage was added. But if the rotation were fertilized, based on response data applicable to the area, the annual value of product from the rotation was higher for the straight grain rotation than when any forage was included, after deducting the cost of the fertilizer.

In many situations, inclusion of forage up to some point, results in additional production of grain, even when the rotation is fertilized. But generally, the effect of using fertilizer is to include less legumes in order to obtain the most profitable rotation.

On livestock farms, however, the market value of crop production is not the only factor to consider. Good livestock producers often can obtain more economical use of resources by including forage even when on the basis of market value of crop production it would not be justified. They can get more than market value from forage, and other feed crops, by efficient livestock operations. It is also important to consider the type of soil and its susceptibility to erosion.

The effect of fertilizer, particularly nitrogen, on rotations that would be most profitable, has important implications when considering changes in farming, whether for the individual farm, or for farmers generally. Farmers can reduce unit costs and increase the margin of returns over total cost by increasing rates of application of fertilizer on the principal cash and feed crops. This puts them in stronger position to make investments in soil improvements often needed when shifting acreage from "surplus" crops to other uses. Many farmers have used fertilizers, particularly phosphate and potash, to aid in making changes that include utilization of forage grown on land diverted from surplus crops. However, for many farmers, this involves a substantial net cost that presents a major problem in the effort to adjust to changes in supply-demand relationships.

The first farmers to adopt new improvements that result in higher yields gain most from advancing technology. As adoption becomes more general, if the demand situation remains unchanged, the effect of increased total production is to lower prices, because demand for farm products is relatively inelastic.

Transition problems are difficult particularly for farmers who do not or cannot adopt the new methods. But individual farmers who can do so, adopt them, thereby increasing their net returns. Failure to adopt improved methods, and to utilize them in making needed changes in farming would have more serious consequences for individual farmers, and for farmers in general.

FEED ADDITIVES HELP TO CUT LIVESTOCK PRODUCTION COSTS

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The use of feed additives in livestock rations has increased rapidly in recent years. These additives include minerals, vitamins, urea, and various medications, such as antibiotics, and the hormone, stilbestrol. Minerals, vitamins, and antibiotics have been widely used in feeds for several years. Stilbestrol was approved for addition to rations for beef cattle in November of 1954, and it is estimated that since then more than 5 million cattle have been fed on rations that contain this hormone.

Preliminary Experimental Results

Much experimental work is being done concerning feeding of these substances, and complete evaluation will have to await further research. Some of the preliminary results can be summarized as follows: For stilbestrol fed beef cattle, results of trials at 9 State experiment stations indicate an increase in the average rate of gain of one-third of a pound per day, or 19 percent, and a 12-percent saving of feed per pound of gain. 1/ However, cattle that receive stilbestrol must be carried to heavier weights to reach the same degree of finish.

According to the National Research Council, addition of antibiotics to rations for young pigs may increase the rate of growth from 10 to 20 percent, and permit an increase in feeding efficiency up to about 5 percent. Antiobiotics reduce scouring and the number of stunted pigs. Greatest value is observed in the early growth period. Effects are reduced when improved sanitation practices are used. Addition of antibiotics to creep-feeding rations may increase pig weights by 5 to 10 pounds at 56 days of age.

Preliminary research findings indicate that antibiotics may offer possibilities for improved efficiency in the feeding of beef and dairy cattle and sheep.

Advantages and Disadvantages of Urea

Urea is used in increasing amounts in rations for ruminants, particularly beef cattle, to replace part of the protein requirements. Addition of urea to the ration provides food for bacteria in the rumen and these in turn supply the animal with protein. The important relationship in determining the economy of urea feeding is the relative price of carbohydrate, and of protein feed. The cost of adding urea to the ration amounts only to around 4 to 5 percent of the total cost of a beef fattening ration.

1/ Experiments summarized by Burroughs, Culbertson, and Kastelic, quoted by T. C. Byerly in "The Significance of Animal Hormones in Animal Feeding." Talk before The Animal Nutrition Research Council, Washington, D. C. (Processed) p. 5.

It is generally considered that 1 pound of urea and 6 pounds of corn will replace 7 pounds of soybean oilmeal. Therefore, it should be profitable to feed urea if the price of a pound of corn is less than seven-sixths of the price of a pound of soybean oilmeal minus one-sixth of the price of a pound of urea.

When prices of protein feeds are high in relation to prices of grains, it should be possible to use urea to lower the cost of feeding ruminants. A comparison of past prices indicates that often it would pay to feed urea to beef cattle, particularly in western areas where prices of protein feeds are relatively high. In some instances, it would be profitable to feed urea to dairy cattle, particularly when high-protein roughages are not available. The use of urea may provide an opportunity to increase the usefulness of nonlegume and low quality roughages in maintenance rations. Urea is toxic if a large quantity is consumed at one time. In general, not more than one-third of the total nitrogen in the diet should be urea. It is necessary to control carefully the amount fed and to mix it uniformly in feed mixtures. Farmers who feed urea usually buy it in a mixed feed.

Antibiotics and Stilbestrol Reduce Feed Needed Per Pound of Gain

The advantages of feeding urea vary with price relationships. Apparently, however, the use of antibiotics and stilbestrol permit reductions in feed costs regardless of the price of feed because they reduce the amount of feed needed per pound of gain. Feed conversion efficiency, that is the pounds of feed required per pound of livestock product, has not changed greatly over the years for most classes of livestock.

It Pays to Improve Feed Conversion Efficiency

Marked gains have been made in feed conversion efficiency for poultry. In the case of broilers, feed consumed per pound of gain has been reduced about 25 percent in the last 15 years. Up to the present, the most extensive use of feed additives has been in poultry rations. Other changes also have been made in breeding, sanitation, and management, and these too, have contributed to the increased feed efficiency.

Economic significance of improved feeding efficiency can be illustrated by data from a Connecticut broiler study, which analyzed the effect on income of an improvement in the ration that increased output per pound of feed about 15 percent and reduced the time required to produce a 3.6 pound broiler by 8 percent. 2/ As a result of the saving in feed cost, labor, and overhead, net profit per bird was increased by 58 percent. If the time saved as a result of more rapid growth were used to produce additional lots of broilers, the net effect of this feed innovation from

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2/ These estimates are calculated from Judge, G. G., and Fellows, I. F. "Economic Interpretations of Broiler Production Problems," Conn. (Storrs) Agr. Expt. Sta. Bul. 302, July 1953.

the standpoint of an individual farmer would be a potential increase in annual income of 67 percent. But, with a widespread increase in feed efficiency, increased output would cause broiler prices to decline. With other classes of livestock, a moderate improvement in feed efficiency would not give so spectacular a rise in profits, because more rapid growth would not be so important a factor.

Wide Variation in Feed Efficiency Among Kinds of Livestock

The approximate average level of feed conversion efficiency for 4 species of meat-producing animals is shown in table 12. Comparisons are shown with pasture both included and excluded, as in many instances feed requirements other than pasture are those of greatest concern costwise to farmers. These are average results. With good management the feed used per 100 pounds live weight produced might be as much as 50 pounds lower for each class of livestock shown.

Table 12.- Feed conversion efficiency, by species, 1949-53 1/

Class of livestock	Feed units consumed per - 100 pounds live weight	100 pounds meat and fat, excluding bone	100,000 calories (food energy)	Pound of protein
	Pounds	Pounds	Pounds	Pounds
		Including pasture		
Hogs	515	819	324	95
Cattle and calves	952	2,186	1,552	138
Broilers	359	674	834	34
Turkeys	543	885	740	44
		Excluding pasture		
Hogs	490	779	309	90
Cattle and calves	577	1,325	940	84
Broilers	359	674	884	34
Turkeys	518	828	706	42

1/ Preliminary estimates, Production Economics Research Branch, Agricultural Research Service, U. S. Department of Agriculture.

Reflecting recent advances in technology, broilers are seen to be the most efficient converters of feed, except in production of calories of food energy, where hogs are outstanding (fig. 7).

Beef cattle are generally the least efficient converters of feed even when pasture consumption is not included. However, they consume large quantities of hay and rough forages that would not otherwise be utilized. Turkeys rank second or third depending on the measure of output used.

With present feed conversion relationships, beef cattle must compete with other meat animals largely on the basis of consumer demand for the product and availability of low-value roughage. Hogs are the least expensive converter of feed into energy by a wide margin, but modern diets place less emphasis on energy. If hogs are not to lose ground to poultry marketwise, improvement will be needed in quality of products, in feed conversion efficiency, or in both.

Results of research indicate that improvements in feeding are possible for all classes of livestock. In light of the gains already made by poultry, the best opportunities probably exist for cattle, hogs, and sheep. Greater attention to improved feeding efficiency is an effective means by which farmers can ease the price-cost squeeze to some extent.

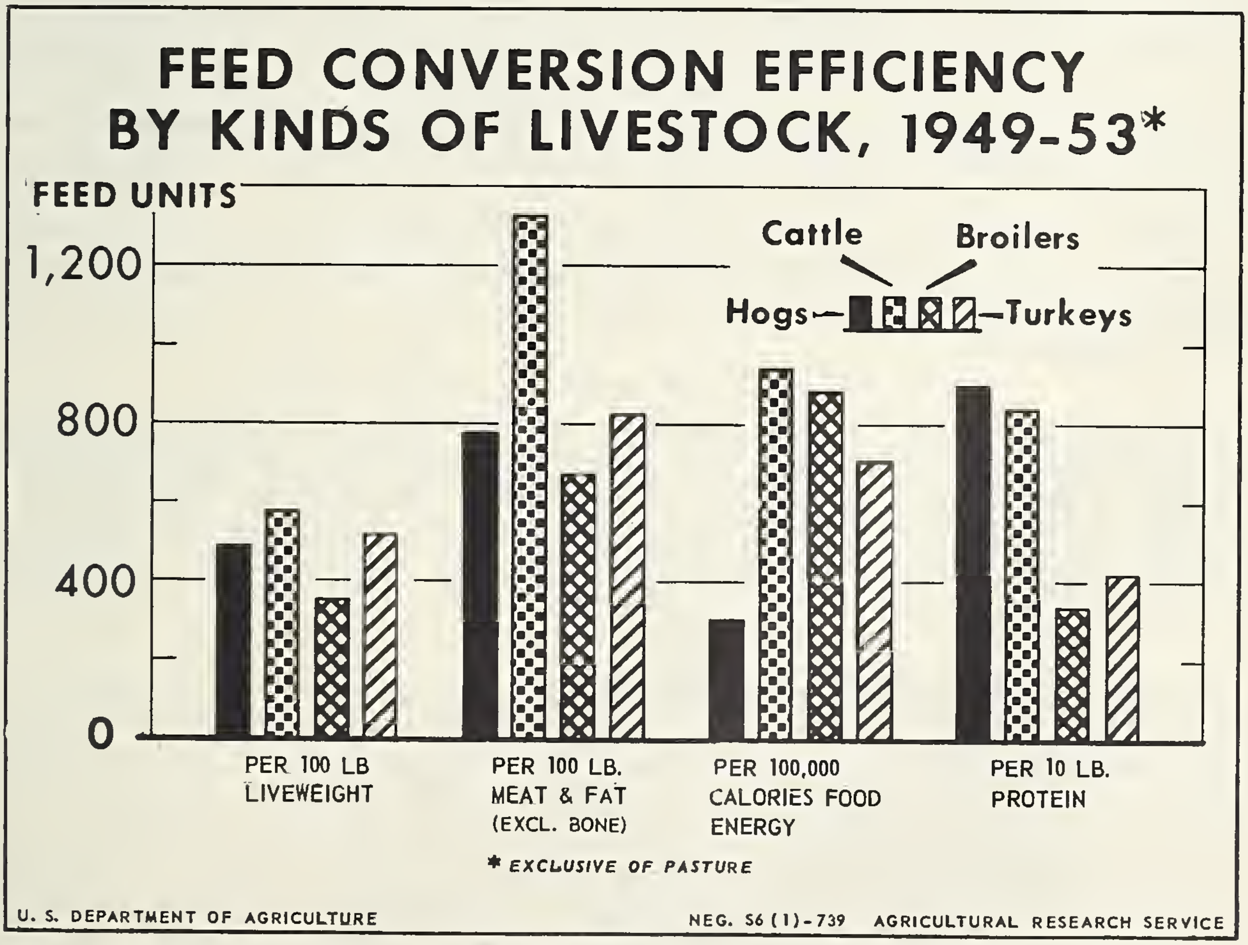

Figure 7

HOW DOES BULK MILK HANDLING AFFECT COSTS ON DAIRY FARMS?

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Bulk handling of milk is a new and rapidly expanding technique in the dairy industry, which affects both producers and dealers directly. The facilities on the farm consist of a refrigerated tank in which the warm milk from the cow is rapidly cooled and kept cool until picked up by the hauler. Although these tanks had limited use as early as the 1930's, their use did not expand rapidly until after 1950. Today, about 20,000 tanks are in use on dairy farms in the United States and the number is increasing daily.

Bulk tanks have certain advantages and certain disadvantages as compared with the usual equipment for handling milk at the farm. These need to be understood by producers when considering a shift to bulk handling, and in adjusting to a bulk tank after it is installed.

Costs are High, Particularly for Smaller Herds

For the present at least, the initial cost of a bulk tank will usually exceed by a substantial margin the cost of can facilities to handle the same volume. This is particularly true for the smaller dairy farms and true if the comparison is made on the commonly accepted basis of every-other-day pickup for the bulk milk, with every-day pickup for the cans. On the larger farms, the difference between the two methods becomes less important and practically disappears if the two are compared on the same frequency of pickup.

These comparisons assume new equipment for both methods. Actually, used cans and can coolers are often available at low cost, and this would widen the difference.

The basic reason for the heavier investment impact on the smaller farms can be seen in table 13. The investment cost per gallon of capacity is high for a small bulk tank, but it decreases rapidly for the larger sizes. With can facilities, the cost per gallon of capacity is relatively low for the smaller sizes, but it decreases only slightly for the larger units.

So far as annual costs are concerned, the main out-of-pocket expense usually is for electricity. The available evidence is not entirely clear, but it tends to show that many farmers can expect to use somewhat less current with bulk handling than with can facilities. Actually, however, this possible saving is slight and, on the smaller farms particularly, it is likely to be overshadowed by the higher annual overhead costs of the bulk tank resulting from the greater investment. Experience may show that this larger investment will be offset by longer life. But at present about all we can do is to assume that the annual overhead costs, largely depreciation and interest, may amount to the same percentage--perhaps 10 percent--for both types of equipment.

Table 13.- Initial cost of farm bulk tanks of different sizes

Size of tank (gallons)	Initial cost, installed		Initial cost per gallon
	Range	Average	
	Dollars	Dollars	Dollars
100	1,000 - 1,500	1,250	12.50
150	1,300 - 2,000	1,650	11.50
200	1,700 - 2,300	2,000	10.00
250	1,800 - 2,400	2,100	8.40
300	2,100 - 3,000	2,400	8.00
400	2,500 - 3,200	2,750	6.90
500	2,700 - 3,500	3,000	6.00
600	3,000 - 3,900	3,300	5.50

On this basis, the annual overhead cost for a 100-gallon bulk tank would be around $125, more than double that for can facilities to handle the same volume. Any likely saving in electricity would be negligible compared with this difference in overhead costs. Conclusions would be similar for the larger tanks if comparisons are made on the basis of every-other-day bulk pickup and everyday can pickup. If compared on the same frequency of pickup (which is not too realistic in most cases), costs would tend to equalize for volumes requiring tanks of 300 gallons or more.

Thus it seems clear that on most farms the advantages of bulk handling must be found elsewhere than in a straight comparison of investment and operating costs for the alternative methods. Some of the other factors, both advantages and disadvantages, are discussed below.

Saves Lifting of Cans and May Save Time

Bulk handling eliminates the job of lifting milk in cans. In addition, it may mean actual savings in time on many dairy farms. For one thing, the can-washing job at the farm--a requirement in some milksheds--is eliminated. Ordinarily, it requires considerably more time than cleaning a bulk tank. Likewise eliminated are the various can-handling operations in the milk-house and, on many farms, in moving the cans down the farm lane to a pickup point on the highway. Estimates made show that on a 2-man dairy farm these savings in time might amount to as much as an hour daily--perhaps more on some farms, certainly less on others. The important point here apparently is that, although the savings in time may be significant on many farms, it is not likely to be large enough to permit much if any reduction in the labor force. The result is more likely to be a shorter working day with no change in receipts or expenses, or an increase in volume of business within the same length of day, thereby justifying higher wages or improved working conditions. In any case, these possibilities, when combined with the reduction in heavy lifting, should make it easier for dairy farmers to attract and hold the skilled workers they need.

Milk and Fat Losses Reduced

Ordinarily, loss of milk and butterfat because of stickage is reduced by bulk handling as compared with cans. This results from the fact that the surface area of the container is much smaller per gallon of capacity in a bulk tank than in a 10-gallon can. The extent of this saving may vary from farm to farm. It could easily amount to 1 percent in milk and perhaps even more in butterfat as there is evidence that fat tests are fractionally higher with bulk handling. Furthermore, the danger of loss from spillage is much reduced with bulk handling.

Price Premiums and Reduced Hauling Costs

To date many, perhaps most, dairy farmers who have adopted bulk handling have received either a price premium, a reduced hauling charge, or both. The price premium has generally ranged from $0.05 to $0.25 per hundredweight of milk, and the reduced hauling charge has had nearly the same range. In a few situations, the combined premium has been as high as $0.40 per hundredweight but more commonly it has been in the neighborhood of $0.10 to $0.15. These premiums may not continue indefinitely but they have provided, and no doubt will continue to provide for some time, an incentive for producers to shift from cans to bulk handling.

An additional advantage of bulk handling is the fact that ordinarily the point of sale is on the farm. This means that the producer is not responsible for any loss of milk that might occur after the milk leaves the farm. He is also given a weight receipt at each pickup which provides him with a current check on the volume of his sales. Furthermore, the samples for butterfat tests are taken from the tank in a way that should mean more accurate tests and that also gives the producer a chance to take duplicate samples if he wishes to do so.

Off-Flavor Milk Sometimes a Problem

Aside from somewhat higher investment and annual costs, at least on the smaller farms, a few other possible disadvantages of bulk handling to the producer have been recognized. Perhaps most important is the quality control problem in handling off-flavor milk. An entire tank of milk can be lost by off-flavor milk from 1 cow, whereas with cans the loss might be only 1 or 2 cans. Ordinarily, however, this problem is not serious. Usually, it can be handled by careful management. On most farms, it is of consequence for only a month or so in the early part of the pasture season.

Milk Production Likely to Expand on Farms Using Bulk Tanks

Thus, it appears that at present many farmers are likely to find both investment and annual costs to be somewhat higher for bulk tanks as compared with can equipment. These higher costs plus other possible disadvantages need to be weighed against the many advantages. Some factors on both sides of the equation are intangible. The answer for any farmer will depend not only on the tangible factors as they apply to his particular situation but also on his feeling about the intangibles. Farmers who do not wish to shift to bulk handling may find themselves faced with rising costs for hauling in cans. In some instances, the producer may have no choice between adopting bulk handling and going out of dairying. In that case, assuming that the farmer stays in dairying, his main concern is how to take full advantage of this new technique in milk handling. This leads into the question of the longer run effects that bulk handling may have on dairy farming.

Bulk handling is one more step in the mechanization of dairy farming. Along with other devices, such as pipeline milkers, barn cleaners, and silo unloaders, it enables the farm labor force to produce more efficiently and helps to eliminate drudgery. These devices have generally been profitable to those farmers who have taken full advantage of them. In most instances, this has meant increased volume of production per farm and per man, which were made possible not only by mechanization but also by companion adjustments in the production of forage and in other phases of dairy farming. These devices have been less profitable to farmers who have adopted them without making the related adjustments. All dairy farmers have been affected pricewise by whatever effects these technological changes have had on overall milk production and thus on prices received.

Thus it would seem that bulk handling of milk is, and will continue to be, a contributing factor toward the longtime trend of greater production per man, per acre, and per farm on dairy farms that have the quality of resources and the management to take advantage of modern technology. At the same time, farmers who lack such resources or such know-how in management have been in a difficult competitive situation, and in many instances, they have shifted to other types of farming or to off-farm employment. These trends have been going on in all the major dairy areas, and no doubt they will continue. However, they may operate at different rates in different areas because of variation in resources and other factors. Thus they may affect the relative importance of the various dairy regions in the years ahead. Bulk handling also increases the flexibility of certain marketing operations and may permit milk to move more freely to the highest priced alternative outlet. In turn, this may also affect the location of production in the long run.

Bulk handling may likewise affect the seasonality of milk production. It seems reasonable to expect that, having made the relatively large investment required for a bulk tank, most farmers will then be interested in using the tank to as near capacity as practicable. One way to do this is to reduce the rather wide seasonal variation in production that is characteristic of most dairy farms. The bulk tank may not always provide a sufficient incentive in itself but it could be a contributing factor in a group of improved management practices, most of which tend to reduce seasonality along with their direct effects on production per cow, per man, and per farm.

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